

Structure of Glucose-6-phosphate Isomerase From *Bacillus stearothermophilus* and Yeast at 1.93 Å resolution

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Glucose-6-phosphate isomerase (PGI) reversibly catalyzes glucose-6-phosphate to fructose-6-phosphate. Besides its primary enzymatic role in the glycolytic pathway, PGI has several other functions. PGI stimulates cell migration and causes B cells to mature into antibody-secreting cells. PGI is an autocrine motility factor responsible for metastasis in cancer. It is also a nerve growth factor. It is a differentiation and maturation mediator that can cause the differentiation of human myeloid leukemia cells. Besides being a marker for several types of cancer, PGI has an effect on the metabolism of red cells, giving rise to hemolytic anemia. The structures of PGI from yeast (553 residues long) and *Bacillus stearothermophilus* A (448 residues long) have been elucidated to high resolution. The present R-factor for the thermophilic enzyme with four monomers in the asymmetric unit of an orthorhombic unit cell (space group P212121) is 0.199. In the thermophilic PGI structure, positions of the substrate glucose-6-phosphate, the product fructose-6-phosphate, and the inhibitors D-erythrose phosphate and D-arabinose phosphate have been located. The yeast PGI structure has been solved by molecular replacement and a notable feature of this structure is the presence of statistically disordered protein molecules, hitherto unobserved.

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